

### **REMARKS/ARGUMENTS**

The applicant has concurrently filed a request for a one-month extension of time. Please charge our deposit account number 02-2095 in the amount of \$130.00 for the extension of time fee. Please also charge any additional fees that may be required, or credit any overpayment, to our deposit account.

The present letter is filed in response to the Office Action of December 18, 2009. Accordingly, this response is timely filed.

#### **Claim Amendments**

Claim 31 has been amended to delete the reference to the exclusion of emulsion explosives.

The Office Action dated December 18, 2009 has been carefully considered. It is believed that the claims submitted herewith and the following comments represent a complete response to the Examiner's comments and place the present application in condition for allowance. Reconsideration is respectfully requested.

#### **Claim Rejection - 35 U.S.C. §102(b)**

The Examiner has rejected claim 31 under 35 U.S.C. §102(b) as being anticipated in light of U.S. Patent No. 5,527,498 to Kelley. In particular, the Examiner alleges that Kelley discloses an ANFO explosive mixed by various methods for use in boreholes that comprises diesel fuel with a surfactant (meets chemical coupling agent) and ammonium nitrate. The Examiner further contends that the oil separation is an inherent property of this composition. For the reasons that follow, the Applicant respectfully disagrees with the Examiner's rejection.

### 1. Improper rejection of claim 31

Claim 31 requires, *inter alia*, “a chemical coupling agent having a long chain aliphatic portion and an epoxy group”. In the rejection, the Examiner made a bald statement that Kelley discloses a surfactant that “meets chemical coupling agent”. However, the claim does not merely specify that there is a “coupling agent” but a specific coupling agent.

The Applicant directs the Examiner's attention to Section 2131 of the Manual of Patent Examining Procedure, where on page 67 (left column, bottom paragraph), the Manual states:

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.  
[emphasis added]

If Kelley discloses a coupling agent having a long chain aliphatic portion and an epoxy group, then the Examiner is requested to point out where such a limitation is disclosed in Kelley. Without making such a showing, the Applicant submits that the Examiner has not set out a full and complete rejection of claim 31.

### 2. Lack of Teaching by Kelley

In order to try to advance the prosecution of this application, the applicant has also reviewed the teaching of Kelley to determine if Kelley teaches the claimed type of coupling agent. The applicant notes that in the first paragraph of the Summary of the Invention, Kelley provides as follows.

In order to increase the oil absorption capacity of the ammonium nitrate, the prill contains as an internal additive an aqueous surfactant, preferably an aqueous alkylaryl sulfonate, and as an external coating a non-aqueous surfactant, preferably a non-aqueous anionic alkylaryl sulfonate. The prill exhibits an oil absorption capacity of at least about 4 wt. % based on the total weight of ammonium nitrate and oil. (Emphasis added)

Further on, in the sixth paragraph of the Description of the Invention, Kelley provides as follows.

Representative surfactants useful in the practice of the invention include the sodium salt of 2-n-butylbenzenesulfonic acid; the sodium salt of 3-tert-dodecylbenzenesulfonic acid; the sodium salt of 4-n-eicosylbenzenesulfonic acid; the potassium salt of 4,-n-tetradecylbenzenesulfonic acid; the lithium salt of 4-tetracosylbenzenesulfonic acid; the disodium salt of 6-n-decylbenzene-p-disulfonic acid; the disodium salt of dimethylnaphthalene-1,2-disulfonic acid; the trirubidium salt of 5-tert-hexadecylbenzene-2,4,6-trisulfonic acid; the sodium salts of methylnaphthalenesulfonic acid, such as the sodium salts of 1-methylnaphthalene-2-sulfonic acid, 1-methylnaphthalene-4-sulfonic acid, and mixtures thereof; the sodium salt of 6-n-eicosylnaphthalene-1-sulfonic acid; the trisodium salt of 6,7,8-triethylnaphthalene-1,2,3-trisulfonic acid; the dicesium salt of 2,5-dimethylbenzene-1,3-disulfonic acid; the disodium salt of 4,6-di-n-decylnaphthalene-1,8-disulfonic acid; the potassium salt of 7-tert-dodecylnaphthalene-2-sulfonic acid; the sodium salt of 2,5-dimethylbenzenesulfonic acid; and the like, including mixtures thereof. Of the above, the aqueous mixture of polycondensed and alkyl benzene sulfonic acid sodium salts sold by Lobeco Products, Inc. under the trade name GALORYL AT725 is particularly preferred as an internal additive and the mineral oil based mixture of alkyl naphthalene sulfonate sodium salts sold by Lobeco Products, Inc. under the trade name GALORYL ATH626M is particularly preferred as an external coating.

The Applicant has not located any reference in Kelley to a chemical coupling agent having a long chain aliphatic portion and an epoxy group. Accordingly, the Applicant submits that Kelley does not disclose any surfactants (or chemical coupling agents), which possess a long chain aliphatic portion and an epoxy group. Accordingly, the Applicant respectfully submits that Kelley does teach this element of claim 31 of the present application, and therefore, does not anticipate the claim.

In light of the above, the Applicant requests that the Examiner's rejection to claim 31 under 35 U.S.C. §102(b) be withdrawn.

**Claim Rejections - 35 U.S.C. §103(a)**

The Examiner has rejected claims 33, 35, 36, 38, 43, 44, 48, 49, 51, 53 and 56 under 35 U.S.C. §103(a) as being obvious in light of Kelley, further in view of U.S. Patent No. 4,595,430 to Baker. In particular, the Examiner contends that Baker teaches that it is known to replace a portion of ammonium nitrate with an additive such as epoxidized soybean oil in an ANFO type blasting composition. For the reasons that follow, the Applicant respectfully disagrees with the Examiner's rejection.

**1. A person skilled in the art would not combine Kelley and Baker**

The Applicant respectfully submits that a person skilled in the art would not consider combining Kelley and Baker as suggested by the Examiner.

Kelley discloses a method for forming a high density prill by the use of certain process steps combined with the incorporation into the prill of certain surfactants. The intent of the process and the use of the surfactant is to cause increased formation of pores in the high-density prill such that the prill will physically absorb more fuel oil, and therefore increase the explosive capacity of the composition (see column 4, lines 10-17 of Kelley). Accordingly, Kelley teaches a method to increase the oil absorption and retention in such prills due to the increased porosity created by the process and enhanced by the presence of a surfactant (see column 6, lines 20-32 of Kelley). The preferred surfactants that are taught are sulfonates.

In contrast, Baker discloses dynamite compositions incorporating desensitizing compounds. The desensitizing compounds, including epoxidized soybean oil (see Table II), help to reduce the highly unstable nature of dynamite compositions. As stated in Baker:

“Preferably the desensitizers should greatly affect the impact sensitivity while only minimally effecting detonation properties.” (Column 9, lines 34-35)

The reference to “minimally effecting detonation properties” appears to relate to actually decreasing the detonation properties. This property was measured in Baker by the gap test. As stated at Column 8, lines 56-65:

“The gap test consists of cutting a 1.25 inch by eight inch stick in half. The blasting cap is placed in one half stick and the second half of the stick is separated from the first half of the stick by a given air gap. The largest separation distance over which the receptor charge (second half of the stick) is initiated reliably is recorded. If the desensitizing compounds adversely effect detonation properties such as the velocity or rate of detonation velocity buildup, the gap value is greatly decreased. Review of Table III demonstrates that while a compound may severely effect gap sensitivity, it may only negligibly effect impact sensitivity. Thus it is apparent that a compound does not necessarily effect the impact sensitivity and air gap sensitivity to the same degree.”

Baker refers to the examples in Table III as showing additives that have only a negligibly effect impact sensitivity. These have a gap result of 10-27 inches. In Table II, epoxidized soybean oil is shown to have a gap of 8, which is lower then the worst result in Table III. Accordingly, a person skilled in the art would understand that epoxidized soybean oil would have an adverse effect on detonation properties.

In summary, Kelley discloses increasing oil absorption of AN prills using a particular class of surfactants. Applicant understands that the surfactants result in increased pore formation in the prills. In contrast, Baker aims to reduce the impact sensitivity of dynamite while only minimally reducing the detonation properties on the dynamite.

Accordingly, the Applicant respectfully submits that the disclosures of Kelley and Baker are directed to two entirely different processes and explosives and that a person skilled in the art would not combine the teachings. The reasons for this are as follows.

- (1) The references refer to different type of explosives.
- (2) The references seek to solve different properties.
- (3) Baker discloses that epoxidized soybean oil can "adversely effect detonation properties" and therefore, a person skilled in the art would not be motivated to use epoxidized soybean oil in Kelley.

Consequently, the Applicant respectfully submits that a person skilled in the art, desiring to reduce oil segregation in an ANFO type explosive, would not combine Kelley with Baker and add a known desensitizing agent to arrive at the method of the present application.

## 2. Kelley teaches a different ANFO explosive

The Applicant further submits that even if a person skilled in the art combined the teachings of Kelley with Baker, they would not arrive at the claimed invention as Kelley teaches a different ANFO explosive than that disclosed in the present application.

The Applicant directs the Examiner's attention to Column 3, lines 13-22 of Kelley, where the inventor discloses the formation of the ammonium nitrate prills:

The invention also provides a method for forming a high density ammonium nitrate prill which exhibits an oil absorption capacity of greater than about 4 wt. %. The process comprises evaporating water from an ammonium nitrate solution to obtain an ammonium nitrate concentrate containing less than 0.5 wt. % water and at least about 99.5 wt. % ammonium nitrate. To the ammonium nitrate concentrate is added from about 500 to about 600 ppm of an aqueous naphthalene sulfonate to form an ammonium nitrate mixture. [emphasis]

Further, at Column 5, lines 9-15, the inventor states:

For the internal additive, the surfactant is typically added to the molten concentrated ammonium nitrate during the prilling operation. After the prills are formed and cooled, the prills are preferably coated with the oil-based surfactant by well known coating techniques such as spraying while the prills are tumbled. [emphasis added]

Accordingly, it is clear from the above disclosure that the surfactant in Kelley is added to the ammonium nitrate during the formation of the ammonium nitrate prills. The ammonium nitrate mixture as described above is then processed through a prill forming apparatus to form the ammonium nitrate prills, which are then mixed with the fuel oil to form the ANFO explosive (see Column 6, lines 41-64 of Kelley). The surfactant in Kelley is added during the formation of ammonium nitrate prills "to increase the oil absorption capacity of the ammonium nitrate" (see Column 2, lines 57-58 of Kelley).

On the contrary, step (b) of presently amended claim 31 requires the following:

b) combining the organic combustible fuel and the chemical coupling agent to produce a liquid mixture and then combining the liquid mixture with the inorganic oxidizer particles to produce a flowable ANFO explosive consisting of inorganic oxidizer particles coated with the liquid mixture and one or more conventional additives. [emphasis added]

As clearly described in presently amended claim 31, the ammonium nitrate prills (inorganic oxidizer particles) have already been formed before being contacted with the chemical coupling agent.

Consequently, even if the references were combined as suggested by the Examiner, the claimed method would not be obtained. A person skilled in the art would use the epoxidized soybean oil of Baker in place of the surfactant of Kelley. Therefore, the epoxidized soybean oil would be incorporated into the prill itself. In contrast, the claimed process specifies that the epoxidized soybean oil is added to the organic fuel. Accordingly, if the references were combined as suggested by the Examiner, the ANFO explosive obtained using the suggested amended process of Kelley would be different to that obtained using the method of presently amended claim 31. Accordingly, the Applicant respectfully submits that even if a person skilled in the art were to combine the teachings of Kelley and Baker, they would not produce the method claimed in the present application.

Accordingly, the Applicant respectfully submits that claim 31 is not obvious over Kelley in view of Baker as suggested by the Examiner. As the remaining claims are all

dependent upon claim 31, the Applicant respectfully submits that the rejection to claims 33, 35, 36, 38, 43, 44, 48, 49, 51, 53 and 56 is moot.

In light of the above, the Applicant requests that the Examiner's rejection to claims 33, 35, 36, 38, 43, 44, 48, 49, 51, 53 and 56 under 35 U.S.C. §103(a) be withdrawn.

The Examiner has rejected claims 39-42, 54 and 55 under 35 U.S.C. §103(a) as being obvious in light of Kelley, further in view of U.S. Patent No. 4,595,430 to Baker and further in view of U.S. Patent No. 6,113,714 to Richard et al. Claims 39-42, 54 and 55 are dependent upon claim 31, and thus the arguments applied hereinabove with respect to claim 31 apply equally thereto. Accordingly, Applicant respectfully submits that claims 39-42, 54, and 55 are in condition for allowance.

In light of the above, the Applicant requests that the Examiner's rejection to claims 39-42, 54 and 55 under 35 USC §103(a) be withdrawn.

#### **Claim Rejections 35 USC §112**

The Examiner has rejected claims 31-33, 35, 36, 38-44, 48, 49, 51 and 53-56 under 35 U.S.C. §112 as there is no basis in the specification for the exclusion of "emulsion explosives". By the present amendment, claim 31 has been amended to delete the reference to the exclusion of emulsion explosives, which overcomes the Examiner's objection.

In light of the above, the Applicant requests that the Examiner's rejection to claims 31-33, 35, 36, 38-44, 48, 49, 51 and 53-56 under 35 U.S.C. §112 be withdrawn.


The Commissioner is hereby authorized to charge any fee (including any claim fee), which may be required to our Deposit Account No. 02-2095.



In view of the forgoing arguments, Applicant respectfully submits that the claims of the present application are in condition for allowance. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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Agent for the Applicant

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